

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

## PCT

WRITTEN OPINION  
(PCT Rule 66)

To:

BAE SYSTEMS PLC  
Group IP Dept.  
P.O. Box 87, Lancaster House  
Farnborough Aerospace Centre  
Farnborough, Hampshire GU14 6YU  
GRANDE BRETAGNE

Date of mailing  
(day/month/year)

16.03.2004

Applicant's or agent's file reference  
XA1540

**REPLY DUE**

**within 2 month(s)**  
from the above date of mailing

International application No.  
PCT/GB 03/02746

International filing date (day/month/year)  
27.06.2003

Priority date (day/month/year)  
09.07.2002

International Patent Classification (IPC) or both national classification and IPC  
G01S13/26

Applicant  
BAE SYSTEMS PLC ET AL.

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.

**When?** See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

**How?** By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

**Also:** For an additional opportunity to submit amendments, see Rule 66.4.  
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.  
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 09.11.2004

Name and mailing address of the international preliminary examining authority:



European Patent Office  
D-80298 Munich  
Tel. +49 89 2399 - 0 Tx: 523656 epmu d  
Fax: +49 89 2399 - 4465

Authorized Officer

van Norel, J

Formalities officer (incl. extension of time limits)

Weman, E

Telephone No. +49 89 2399-7961



## I. Basis of the opinion

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed"*):

**Description, Pages**

1-12 as originally filed

**Claims, Numbers**

1-22 as originally filed

**Drawings, Sheets**

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been and will not be examined in respect of:

☐ the entire international application,

☒ claims Nos. 21,22

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 21,22 are so unclear that no meaningful opinion could be formed (*specify*):

**see separate sheet**

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos.

2. A written opinion cannot be drawn due to the failure of the nucleotide and/or amino acid sequence listing to comply with the Standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	1,2,4,6-9,11,12,14,15,17,18
Inventive step (IS)	Claims	19,20
Industrial applicability (IA)	Claims	

**2. Citations and explanations**

**see separate sheet**

1. **Section III:**

No opinion about the novelty, inventive step and industrial applicability of the subject-matter of **claims 21 and 22** is provided here.

References as "with reference to Figures 3 to 6" and "with reference to the accompanying drawings" are not allowable, according to Rule 6.2(a) PCT.

It would be appropriate to remove claims 21 and 22.

2. **Section V:**

Reference is made to the following documents; the numbering will be adhered to in the rest of the procedure:

D1 = EP-A-0291337

3. The subject-matter of claims 1 and 6 is not new (Article 33 (2) PCT).

3.1 **Claim 6:**

D1 discloses a radar system (see D1, Figures 1, 8 and 9) comprising:

- means (1,2,4) for generating a radar pulse;
  - means (3,5,6,9,31) for modulating the radar pulse;
  - means (10,11,12) for transmitting the radar pulse;
  - means (11,12,13) for receiving a reflected radar pulse;
  - means (5,6,9,14,31) for modulating the received radar pulse; and
  - means (1,15,16,40,41,42) for processing the modulated received radar pulse to obtain range information (see D1, Col. 11, Lines 5-6); and
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- whereby the means for modulating the radar pulse includes a phase shifter (6,9,31) which applies a time-dependent phase shift, which is changed at discrete time intervals (see D1, Col. 3, Lines 56-63), at substantially the radar transmission frequency (i.e. at the local oscillator frequency in D1, which is substantially at the radar transmission frequency, which is commonly known in the art), and
  - the means for modulating the received radar pulse includes a phase shifter (6,9,31) which applies a time-dependent phase shift, which is changed at discrete intervals, at substantially the radar transmission frequency; and
  - the means for processing the modulated received radar pulse includes sampling means (40) for sampling the received signal at discrete time

intervals which are an integral number of the time intervals of the time-dependent phase shift (the latter feature is commonly known in the art, and implicitly disclosed in D1).

Hence, D1 discloses a radar system having all the features of present claim 6.

**3.2 Claim 1:**

The features of method claim 1 correspond to the features of apparatus claim 6. Furthermore, the radar system disclosed in D1 is also considered to provide a high range resolution (e.g. see D1, Col. 1, Lines 47-50).

Thus, the subject-matter of claim 1 is not new:

4. In addition to the above, D1 anticipates the subject-matter of the following claims of the present application:

**4.1 Claims 2 and 7:**

Each phase shifter is driven in accordance with a synthesised sequence (see D1, Col. 3, Lines 62-63).

**4.2 Claim 4:**

The time-dependent phase shift produces a predetermined phase profile (see D1, Col. 6, Lines 15-25).

**4.3 Claims 8 and 9:**

It is considered as trivial features to implement the synthesised sequence by a plurality of discrete logic components or a FPGA.

**4.4 Claims 11 and 12:**

The means for modulating the radar pulse includes a local oscillator (5) and first mixing means (3), the local oscillator providing a signal for mixing with the radar pulse in the first mixing means. The local oscillator signal is phase shifted prior to mixing with the radar pulse (see D1, Figures 1 and 8).

**4.5 Claims 14 and 15:**

The means for modulating the received radar pulse includes a local oscillator (5)

and second mixing means (14), the local oscillator providing a signal for mixing with the received radar pulse in the second mixing means. The local oscillator signal is phase shifted prior to mixing with the received radar pulse (see D1, Figures 1 and 8).

**4.6 Claims 17 and 18:**

A single local oscillator (5) is utilised which provides a local oscillator signal to both the radar pulse and the received radar pulse. A single phase shifter (6,9) is utilised for both modulation of the radar pulse and modulation of the received radar pulse (see D1, Figure 1).

5. Dependent **claims 19 and 20** do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step.

Digital phase shifters and comprising monolithic microwave integrated circuits are commonly known in the art. Including such phase shifters in the system disclosed in D1 would be an entirely self-evident approach for the skilled person.

6. Notwithstanding the above objections, it appears that the features of dependent claims 3, 5, 10, 13 and 16 are new and involve an inventive step.

7. The following matters also require attention:

- 7.1 reference signs in parentheses should be inserted in the claims (Rule 6.2(b) PCT). This applies to both the preamble and characterising portion.
- 7.2 the opening pages of the description should be brought into line with the new claims.
- 7.3 document D1 should be referred to in appropriate terms in the description to comply with Rule 5.1(a)(ii) PCT.
- 7.4 as a precaution, care should be taken to avoid giving rise to objection under Articles 34(2)(b) and 41(2) PCT by the inadvertent addition or deletion of subject-matter which extends the content of the application beyond that of the application as filed.
- 7.5 in order to facilitate the examination of the conformity of the amended application with the requirements of Article 34(2)(b) PCT, the applicant is requested to clearly

**WRITTEN OPINION  
SEPARATE SHEET**

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International application No. PCT/GB03/02746

identify the amendments carried out, and to indicate the passages of the application as filed on which these amendments are based (see also Rule 66.8(a) PCT).